

**Kinption Fit Web Site and Interactive CD for Their First
Album *Shriven***

By

Eli Duberow

Submitted to
the Faculty of the Information Engineering Technology Program
in Partial Fulfillment of the Requirements for
the Degree of Bachelor of Science
in Information Engineering Technology

University of Cincinnati
College of Applied Science

May 2002

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Eli Duberow

6-6-'02

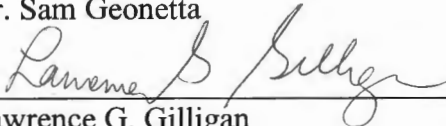
Date



Dr. Sam Geonetta

6-6-'02

Date



Lawrence G. Gilligan

6-6-'02

Date

Acknowledgements

I am greatly thankful to everyone who has provided me with knowledge and monetary support throughout the development of my Senior Design project. I am extremely appreciative for everyone who has provided advice and direction in the many aspects that have dealt with my project. Much thanks goes to the University of Cincinnati and faculty members who prepared me through all my coursework for this final capstone project. I have much gratitude for my advisor Dr. Sam Geonetta for his guidance throughout all my Senior Design classes, and for working with the University to provide all of the software I have needed for my project. I would also like to recognize Professor Tom Wulf for his input into my project, and for helping me get space for my Web site on University or Cincinnati's Streaming Media Server. Last but not least I would like to thank Lucas Duberow and other Kinition Fit band members for their music video, other music tracks, pictures and collaboration.

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Abstract

I have created a Web site for the rap/rock band Kinition Fit. I have also created and an interactive CD-ROM for their first album *Shriven*. The Web site has been placed on an IIS Server. Because of technical requirements, however, the audio and video portions are on a Linux Streaming Media Server. My productions include: a music video, individual biographies of band members, an interview video with the band's leader, pictures of the band, ten music tracks, a help page and a Flash introduction.

Many successful Alternative, Punk and Grunge bands that all have a fresh twist on pre-existing music trends use their Web sites and interactive CD's to display their talent. This multimedia project highlights the talents, creativity and message that Kinition Fit wants to convey. The products I have created involve a version viewable over the Web and an enhanced CD-ROM version that are both easy for a user to explore. Animations, video content, music tracks, pictures and individual biographies of band members entertain the user.

The Flash introduction was designed primarily with Flash 5; the animations were designed with Jasc Animation Shop and 4D Cinema. The interview video and music video I transferred to a PC using a IEEE 1394 Fire wire card and edited with Adobe Premiere and After Effects. I designed the graphics, 2D and 3D animations for visual appeal, including a copyrighted Blue Armed Sun band icon and Kinition Fit's custom and animated logos. All the elements were integrated using Lectora Publisher authoring software, then published to one file (CD and HTML) and compressed with encoder codec programs. The CD file was burned to a CD and the HTML was uploaded to a Linux Streaming Media Server.

This document explains the need for and purpose of the Web site and interactive CD. The literature I researched for learning the technology, used for the project and development of the product, is used to help discuss the significance of software and hardware used to complete the project. How such elements, including functionality of my Web site and interactive CD, the graphics and animations designed and the integration of video within the project, have met the criteria of the deliverables is discussed in detail. This document also includes a description of my application, the budget, timeline, software and hardware configurations and numerous figures to illustrate development of the project.

Kinipion Fit Web Site and Interactive CD for Their First Album *Shriven*

1. Statement of the Need

1.1 Introduction: A Look at the Market

When someone is purchasing a music Compact Disc (CD) and has the choice between one that includes a music video and one that does not, they will choose the one that has a music video. Successful Alternative, Punk, and Grunge bands either all have a fresh twist on pre-existing music trends, or they lure the attention of fans in another way. Rob Zombie, Madonna, Biohazard, Janet Jackson and Pearl Jam all have Web sites that use impressive Flash (7) introductions to arouse the fans' curiosity. Promoting a band by having its music videos available for view or by getting radio stations to air songs brings the band to the public and gives its members a chance at stardom. The Ultimate Band List's site (www.ubl.artistdirect.com) (13) and MTV (www.mtv.com) (10), or the Enhanced CD (ECD) Database (<http://www.musicfan.com/e.cd/>) (4) are all notable companies focused on creating business for the music industry. Examples of interactive "enhanced" CD's (ECDs) include Megadeth's *Risk*, Reba McEntire's *If You See Him*, Primus's *Tales From the Punch Bowl*, Bach's *The Man & His Music*, and Ozzy Osborne's *The Ozzman Cometh*.

New storage devices such as *ipaq* from Compaq, shareware subscription companies like MusicNet that charge members a monthly fee, and swapping systems like Aimster are more recent developments in the ever-changing music industry. The music industry depends on profit from music sales, whether it is through monthly music subscriptions over the Web or through music CD's. Despite the legal battle over the Web

it is still a useful method for cheap publicity when a band is attempting to emerge into the music scene (8). People are always going to want to bring their music with them in some form or another, and if they have the option most people would also enjoy a visual representation of the music they are listening to. Until music and music videos are more easily accessible on handheld devices current trends are toward docked Web access and ECD's.

Reasons for creating interactive CD's and Web site presentations as an essential form of publicity to keep up with today's music artists are many. Jay Sandom exemplifies this: "If you're being driven somewhere in the back seat of a car, you may not remember how you got to your destination; but if you had been driving the car yourself, chances are you could get there again. Studies indicate that if you're stimulated with audio, you will have about 20 percent retention rate, audio-visual is up to 30 percent, and in interactive multimedia presentations where you are really involved, the retention rate is as high as 60 percent (14)." The best choice to grab attention is through multimedia presentations.

2. The Proposal for an Interactive CD and Web Site

2.1 The Purpose

This multimedia project should express the talents, creativity, and message that Lucas Duberow's band, Kinition Fit, wants to convey. Producing and marketing an interactive CD-ROM for Kinition Fit's first album, *Shriven*, and a band Web site are essential keys to success. These will allow Kinition Fit to communicate through multimedia facets such as sound and sight. The primary focus will be numerous

multimedia elements integrated into both an interactive CD and Web site for Kinition Fit.

The band needs this CD and Web site to compete with other successful Alternative music groups, many of which have interactive CD's and Web sites. Lucas Duberow, the band's leader says "I am thankful that you are going to enhance my chances on making it big by providing services, which I have neither the time, money, nor abilities to do myself (3)." Lucas provided the main video footage for the music video he on created for the CD. Horizon Productions, Inc. uses many of the same tools to do professional multimedia development as I am planning to use in my project (2).

2.2 Development of the Product

2.2.1 Definition of Need

The dynamic authoring tool Lectora will be used to integrate all the multimedia elements to create the ECD and to transfer the material to HTML (Hypertext Markup Language) to create the Web site. Lectora is more trouble free; it does not freeze up in migration, and is more compatible with the applications that must be transferred into it in comparison to other authoring programs (6). Database, networking, and application programming knowledge in general will be needed to complete the CD and Web site. I will bring together computer graphics, sound, and video within a meaningful navigation interface. Flash could be used to develop the CD and Web site, but as an authoring tool it is not the most extensible and lacks networking functions.

2.2.2 Review of the Literature

I plan on using Flash primarily for the CD and Web site introduction to capture the users' attention. David J. Emberton's comparison of Macromedia's Flash and

Director noted the popularity of Flash because of its strengths: "Because it functions as both an illustration and an animation program, Flash can afford more flexibility... definitely Flash is among the most popular plug-ins available and, depending on whom you believe, is more widely installed even than Java." The Flash plug-in comes with most popular browsers, and is compatible with almost all Web browsers (4). Lucas will use Acid, a digital software application, to create songs, remix tracks, develop music beds, score videos, and develop his music for the Web site and Flash animations I will create (7, 9).

Computers with the capabilities like the one listed in the budget in section 5.1 will be used to run programs needed for development efficiency so that the programs will run fast, with no freeze-ups. Such fast CPU's, large hard drives, and substantial amounts of RAM are needed to keep up with the larger file size capabilities of newer applications, and to backup these files regularly. The CD will run on computers with substantially less than half of the CPU speed or RAM, but quality will be decreased. For recording interviews and music videos, an upper end digital Canon video camera helped assure quality digital video.

The final products will be delivered to the general public. The Web site will be placed on an appropriate reliable server for access by many people. The CD will be produced in quantity for fans. Both the Web site and the CD will be promoted in magazines, on TV, and on radio stations.

3. Product Description

Producing and marketing an interactive CD-ROM for the alternative rock/rap music group Kinition Fit's first album *Shriven* and a band Web site are keys to the

band's success. Since many popular musicians and well-known companies communicate through auditory, visual and interactive channels with interactive CD's and Web sites so will Kinition Fit. The primary focus includes multimedia elements integrated into both an interactive CD and Web site for Kinition Fit. An interactive CD and Web site are tools that will help Kinition Fit compete with other successful alternative music groups in ways it currently has neither the time, money, nor abilities for (3).

3.1 User Profile

The final products will be versatile and reliable enough so that the average music fan will be able to view and interact with the contents. This fan will need to be familiar with using Windows and a Web browser like Internet Explorer (5). The user should know how to update files over the Internet, and install and run CD-ROM programs. A user of the application will need to have familiarity with using a keyboard and mouse with CD ROM's and Web applications. There will be a pamphlet within the jewel case that accompanies the enhanced CD in the final product that should aid the user in the operation of the interactive CD.

The Help screen in the application itself can be accessed from the Main Page and contains similar helpful information. For example if the user is unable to access the music video they will be instructed to access the Microsoft Web site to download the latest codec package, which will solve the problem in most cases. Accessing the content on the Web site will be just as easy accessing any other common music and video files or Web sites. The user should understand that the older their computer and slower their Internet access is, the more likely that their older and slower hardware will have trouble with newer, more current standard software that was used to develop my application.

3.2 Multimedia Design

The interfaces will be created using Lectora. Even though it has been fairly easy to add files to Lectora, sometimes it can be tricky to get the file added to meet all the requirements. For instance, after more than an hour of trying to add a Flash 5 animation in differing ways opening and configuring it as an .avi video file in Lectora was what proved successful. The art, animations and images I created using Jasc Paint Shop Pro, Animation Shop and Cinema 4D XL. The Flash introduction was created with Flash 5. The Animation Shop Flash sections had to be saved as .gif animations and imported as .gif animations into Flash. The music video and interview were shot with a high end Canon digital video camera, edited in Adobe Premiere and After Effects, and saved as an .avi file. Almost all multimedia tools and packages today rely on the .avi file format to handle audio and video data; it was the best choice for my project as well (9).

Often extensive rendering/editing had to be done on images, text, icons, logos, video and animations; this included extensive work with color and the color scheme. The design scheme includes the placement, size and position of the objects, the colors used and the quality of the text as well as images. The colors had to complement each other in either an extreme or subtle way, while not clashing. Many decisions were made to ensure the video content within the project was high quality. The video was edited from raw footage to contain specific relevant material, such as answers to questions in the interview video.

The organization scheme focused on the Main Page; all the other sub-pages are accessed through text image button links from the Main Page. A user can return to the Main Page by a “Main Page” link in the bottom right-hand corner of every Web page.

Each Web page (See Figure 1., page 7) was organized within Lectora as a book is organized: pages fit within sections and sections fit under the title. The Exit Page, Help Page and Individual Bio's Page contain links to view their content on other Web pages. The Splash Page screen (See Figure 2., page 8) is meant to be the first page viewed by the user. It gives a user the option of viewing the Flash Page introduction or the Main Page containing all the other Web pages. If a user does not have the Flash plug-in installed in their computer they will want to skip the Flash introduction.

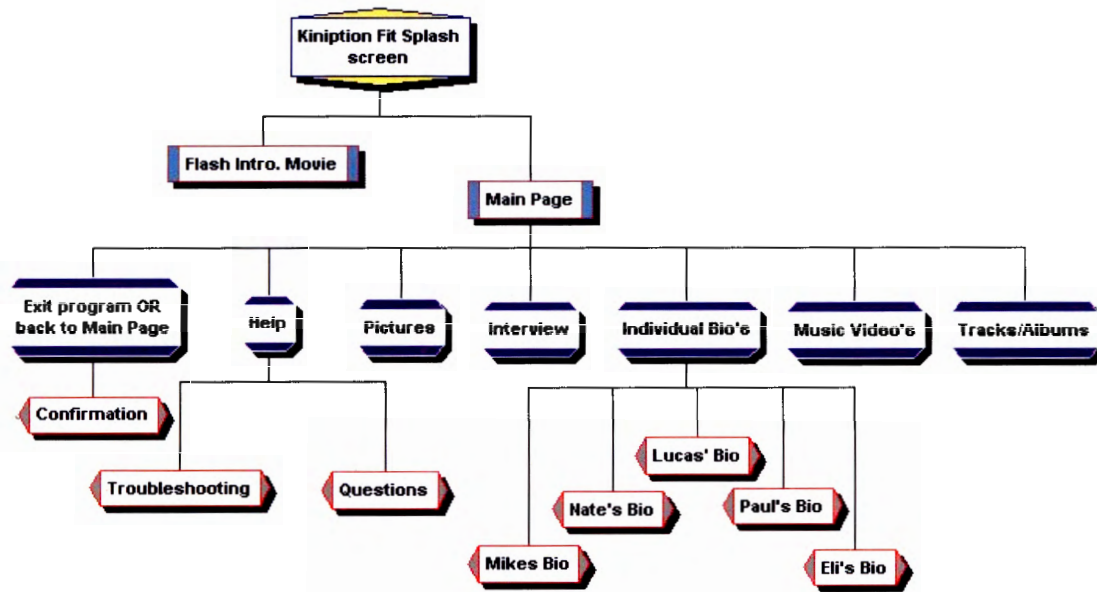


Figure 1. Organizational Chart

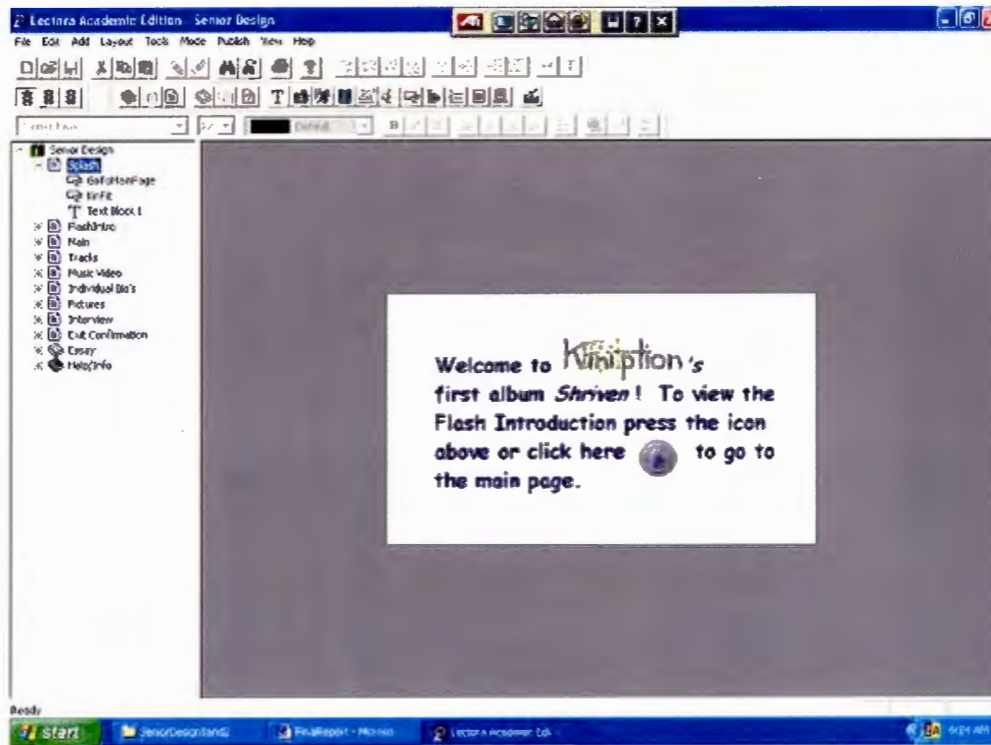


Figure 2. Splash Page

3.2.1 Main Page

The Main Page (See Figure 3. on page 9) contains a links to all other pages. The user is able to navigate to every destination and return to the main page within two clicks. The user is able to view information about the artist, pictures, a music video, exit or view the Flash animation a second time if they choose. The main page also contains a logo animation as well as the “blue-armed sun” artwork I created.



Figure 3. Main Page

3.2.2 Tracks

On the CD, the Tracks Page (See Figure 4. on page 10) will display all the tracks for the first album *Shriven*. On the Web site this link will be called “Albums”, and *Shriven* will be listed with information regarding the album and a sample of a few of the tracks. For the music I used .wav and .mp3 file types. The songs were added as music files in Lectora. Recorded vocals, guitar riffs and drums formed musical tracks. Some songs were created by basing guitar track lyrics on a constructed beat and making the rhythm follow it, while other audio tracks were developed by creating guitar and lyrics and then creating and matching the beats and bass to follow the lyrics and guitar. In the editing process Lucas doubled and fattened tracks, adjusted the volume levels, varied

some of the tempos, remixed them and used some effects in order to achieve the desired sound for each song.

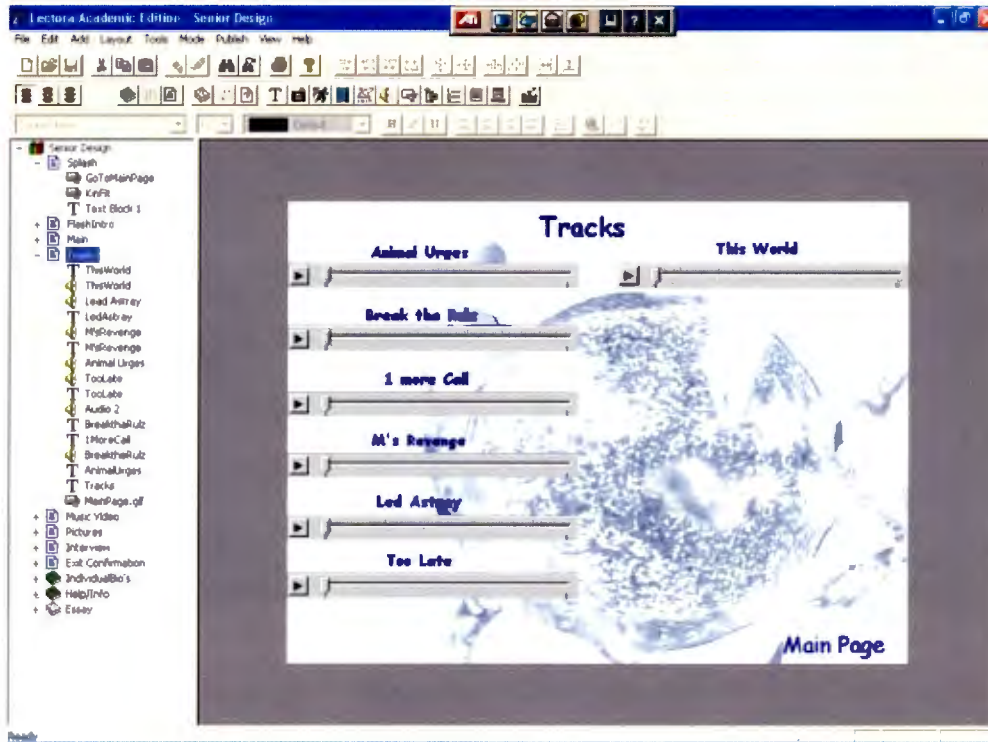


Figure 4. Tracks

3.2.3 Music Video

The music video (See Figure 5. on page 11) titled "1 More Call" was saved as an .avi file and added to Lectora as a video file. The music video will not appear in full form on the Web site due marketing reason the customer has. The video footage was shot primarily in Honolulu, Hawaii though some of the footage Lucas got courtesy of NBC. The video was edited in Adobe Premiere and After Effects. The music video is a documentary based around the September 11, 2001 Twin Trade Tower Bombing and the effects on Hawaii and the rest of the world. Scoring was done to the video to insure that the lyrics were synchronized with the video footage.



Figure 5. Music Video

3.2.4 Interview

The band's leader Lucas Duberow's interview is in .mov format. Lucas expresses the band's focus, musical style and its expected audience. Video editing, rendering, and graphics integration was done with Adobe Premiere and After Effects. Clips of the music video are intertwined to help emphasize what Lucas is expressing.

The 3D animations included in the interview video were prepared with Cinema 4D XL. The Key animation flies through space, flips around and unlocks, while the scrolling red text passes through the screen saying "Unlock...Who". The 4D Cinema animated 3D logo flies from the background letter-by-letter as it forms the band name.

Figure 7. 3D Animated Logo

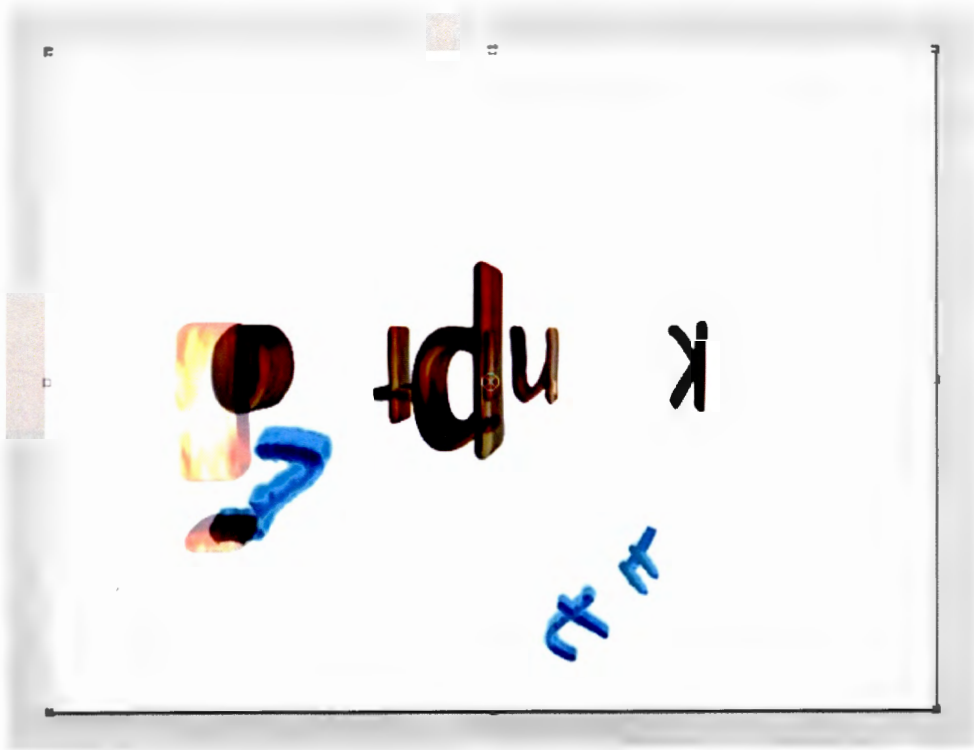
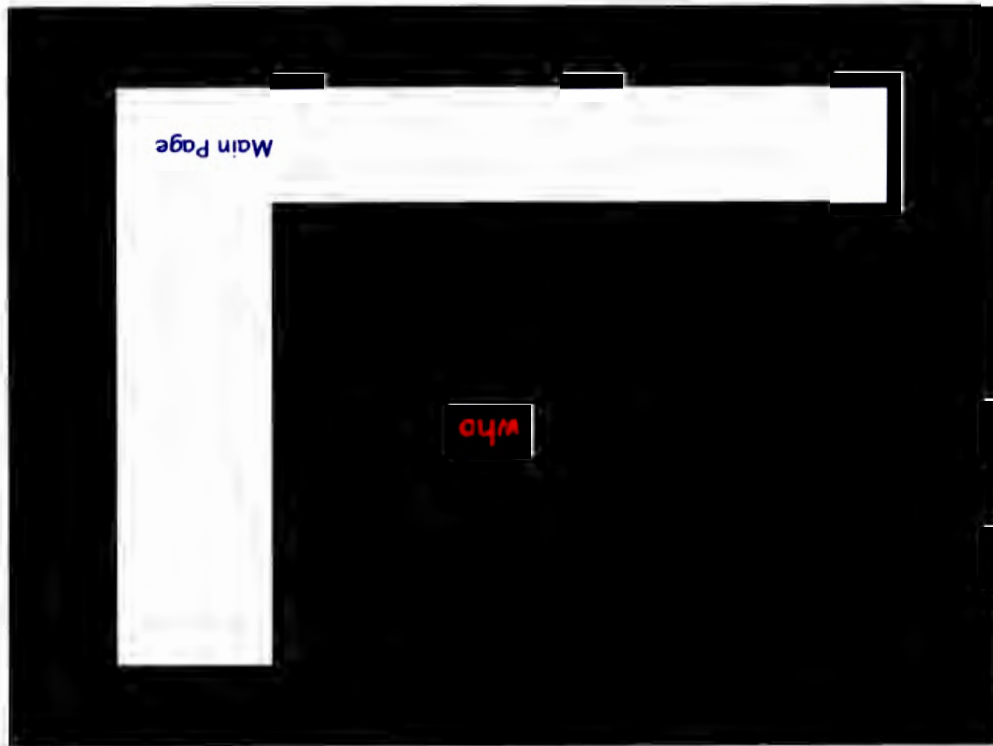


Figure 6. Animated Key



3.2.5 Individual Biographies

The “Individual Bio's” will include biographies of the band's leader and other band members. My biography as designer will also be included. A link to view more pictures will take the user to the Picture Page. The user gets to know where band members are from, their musical involvement and inspiration, and future endeavors, among other details.

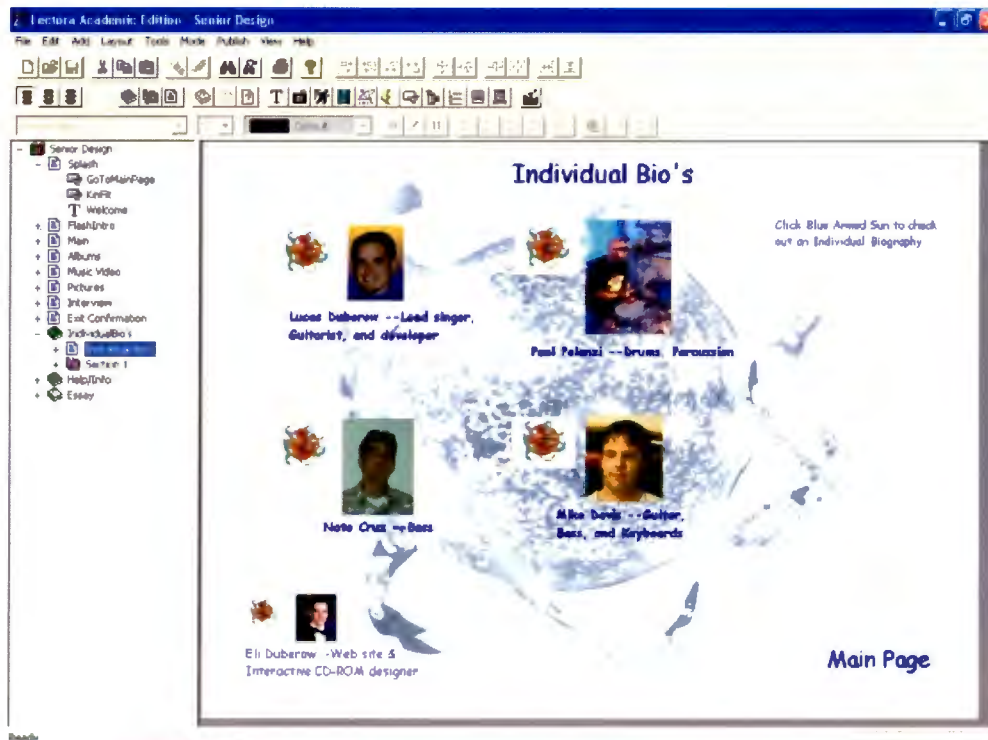


Figure 8. Individual Bio's

3.2.6 Pictures

Numerous pictures of the band's leader Lucas Duberow, and pictures of everyone who played the role of a band member in any way are included. Some pictures with his hometown friends, family and a picture of me may also be viewed as.

3.2.7 Exit

The Exit screen will display: "Thanks for being driven to check out our 1st album *Shriven*. Are you sure you want to leave Kinition Fit?", with the options of "Check ya later dude." to fully exit the program or "I'll stay a while." to cancel the exit operation.



Figure 9. Exit Confirmation

3.2.8 Help

The Help screen includes general navigation directions included in the troubleshooting page. Instructions for downloading the latest codec package and QuickTime or Flash Plug-in are also included. The user can choose to answer questions about who they would like to see Kinition Fit tour with or order a CD by following the instructions.

8. Recording scenes with an upper end Canon Digital video camera and then doing extensive rendering in Adobe Premiere and After Effects created the music video and interview video.
9. 3D animations will be incorporated into video and animations to enhance visual effect.
10. The Web site will be hosted on an IIS Server however audio and video content was added to a Linux Streaming Media Server.

5. Design and Development

5.1 Budget

Budget:		
	Item	Cost
A. Hardware:	AMD Athalon Thunderbird 1GHz, 768 MB RAM, ATI Allinwonder 2000, 40 GB Hard Drive, CD-RW, CD-ROM	\$ 800.00
	Canon MCII Digital Video Camcorder	1,300.00
	Buslink IEEE 1394 FireWire Card	50.00
	Digital Video Tapes (3 for \$20.00)	60.00
B. Software:	Lectora Publisher	30.00
	Flash 5	399.00
	Acid	50.00
	Adobe Premiere	203.00
	Adobe After Effects	626.56
	Jasc Paint Shop Pro 7 w/Animation Shop	138.00
	Cinema 4D XL	1,695.00
	Terran Cleaner 5	\$ 500.00
	Windows Media Player	<i>free</i>
Total Costs:		\$5,851.56

5.2 Timeline

Kinption Fit's Interactive CD and Web site				
Product/Service	State of Development	Tasks to be Done	Week	Date
	Beginning	Met with Dr. Kreppel Research, development, planning & Proposal Development	1; 2 - 6	8/24/- 11/13/2001
	Beginning	Work on proposal presentation	6; 7	11/15/- 11/19/2001
	Beginning	Thanksgiving Break	7	11/21-24/01
	Beginning	Proposal Oral Presentations	7	11/29/- 2/6/2001
	Beginning	Collect software & hardware	8	12/7/2001
	Beginning	Install software	8; 9	12/8/- 12/11/2001
	Beginning	Learn software	9; 10	12/13/- 12/20/2001
	Intermediate	Film Interview	10	12/23/2001
	Intermediate	Film additional footage	11	12/28/2001
	Intermediate	Start general layout	11	1/3/- 1/10/2002
Develop Interactive CD	Intermediate	Make layout precise	12; 13	1/12/- 1/13/2002
Develop Interactive CD	Intermediate	Work on functionality & interactivity	13; 14	1/17/- 1/24/2002
Develop Interactive CD	Intermediate	Integrate sound and video	14	1/26/- 1/31/2002
Develop Interactive CD	Intermediate	Final Touches	15	2/2 - 2/7/2002
Flash	Intermediate	Create Flash intro for CD	16; 17	2/9/- 2/16/2002
Flash, Lectora, PSP, Adobe Premiere	Intermediate	Fine tune Flash animation & make layout, interaction, and video precise. Integrate applications together.	18; 19	2/19/- 2/26/2002
Various	Final	Give layout more content and detail.	19	2/28/- 3/2/2002
	Final	Work on functionality & interactivity	20	3/5/2002
	Final	Prototype Due & Design Freeze	20	3/7/2002
	Final	Presentations	20	3/9/2002
Develop Web site	Final	Integrate sound and video	21	3/12/- 3/16/2002
Develop Web site	Final	Spring Break	22	3/19/-3/23/2002
Develop Web site	Final	Create Flash intro for Web site	23	3/26/- 3/28/2002
Flash	Final	Create Flash intro for Web site	23	3/30/- 4/6/2002
Cinema 4D	Final	Learn 3D Animation	25	4/9/- 4/11/2002
Cinema 4D	Final	3D Animation	25	4/13/2002
Cinema 4D	Final	3D Animation	26	4/16/- 4/18/2002
Adobe Premiere and After Effects; Lectora	Final	Publish Web site; Video Editing Prepare for Tech. Expo.	27	4/21/- 5/15/2002
Adobe Premiere and After Effects	Final	Final Touches; Video Editing	28; 29	5/17/- 5/29/2002
Discreet Cleaner Pro	Final	Compress CD(s)		
	Final	Work on final presentation		
	Final	Final Presentations	30; 31	5/30 & 6/6/2002

6. Proof of Design

6.1 Completion

The interactive CD and Web site for the alternative rap/rock music group Kinition Fit and their first album *Shriven* was designed to include all proposed audio, video, animation, and graphic elements. Navigation graphics guide the average computer aware music fan through the application to sections on the band's members, music, and message(s). If a user's computer has the recommended computer hardware, and software most platforms should be able to execute the application. The help section should adequately aid the user if he/she should experience difficulties running the application. Video footage was logged, recorded, and edited in Adobe Premiere and After Effects. 3D animations were integrated into video and animations to boost the end product quality. The Web site was successfully hosted on a Linux Streaming Media Server.

6.2 Files Used

Many different files having different file types were created for this project. All files are organized into one Folder called "CD" for the interactive CD. All files are in specific locations that Lectora can read from. Many of the file type have certain formats that require special programs to edit or create them. The Lectora file contains instructions on how to incorporate and access all the different files under its umbrella.

When Lectora Publishes to CD or HTML format it gives the user the option to discard any files that are not directly connected with interactivity in the program. This is good so to keep the program size to a minimum, but it is important to make sure extra files are not overlooked that need to be included. After publishing desired content to CD

or HTML it is possible to add files later or adjust code before burning the content to a CD or publishing to a Web Server.

I used Windows Media Encoder to encode the .avi multimedia files and interview videos, changing them to .wmv file format so that the files could stream on the Web. The audio tracks that were streamed were converted because of the .wma extensive file format design it is used to store synchronized multimedia data. When audio and/or video content is compressed with a wide variety of codecs an .wma/.wmv file is a good place for storage.

The HTML had to be edited so that the file path of the video would be the new location(s) it has on the Linux Streaming Media Server instead of the location Lectora referenced it to when it published the content to the CD Folder. Three different versions of the video were created with Windows Media Encoder through different codec specifications to compress the video to serve users with 56 kbps and higher, 200 kbps and higher or 700 kbps and higher Internet connection speeds. An .asp like Unix based interface format was used to upload my Web content to the http Linux Streaming Media Server using file transfer protocol (ftp).

6.3 Programs Used

6.3.1 Adobe Premiere

The video that was shot and transferred to computer used a MiniDV camcorder because it is a standard that offers better optics, higher resolution CCD light sensors, and more rugged transport mechanisms (5). Video was transferred from the camcorder to computer using an IEEE 1394 standard FireWire Card for device control within the computer into Adobe Premiere. Some video was cut so that start and end points for clips

were set to include only the desired footage. The time line within Adobe Premiere was set to include specific space for animations and graphics. Once the time was set in Premiere additional graphics and special effects were added in Adobe After Effects (1).

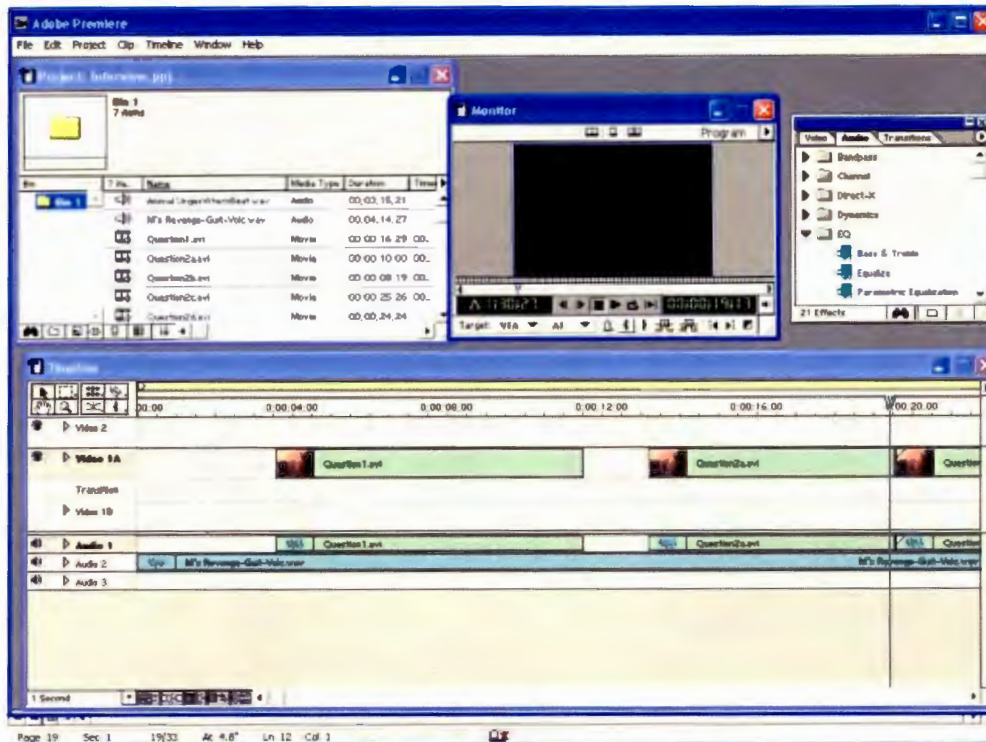


Figure 11. Adobe Premiere

6.3.2 Adobe After Effects

Using the program I modified different objects including created text, solids, compositions, the music video and Cinema 4D animations. Transforming the opacity, scale, rotation, and position of all the different objects along certain Keyframes were the primary effects applied to each object. Each object has its own layer that includes a variety of different effects with numerous properties. Rendering the final composition included much time, proper video codec compression choice is important and applying

the best project settings for the specific project objectives will generate video of maximum quality.

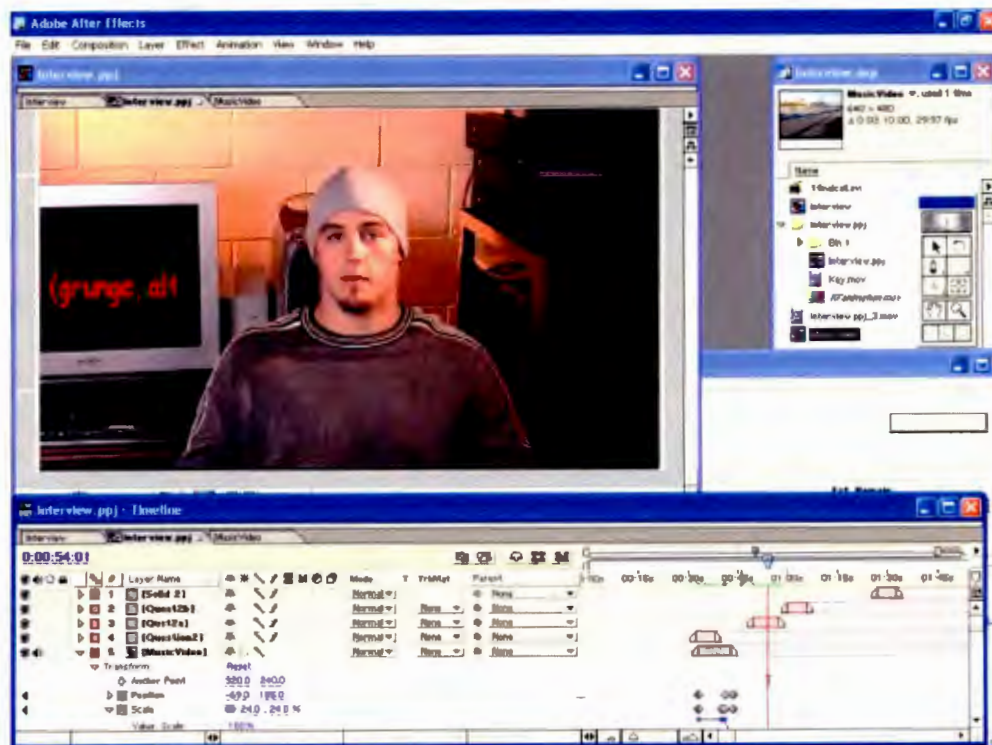


Figure 12. Adobe After Effects

6.3.3 Acid

Sonic Foundries' Acid, audio editing program was used extensively for recording vocal lyrics and inserting guitar tracks and temporary drum rhythm beats. I used it to duplicate a mono section of the interview video, changing the gain to create a surround sound stereo configuration that made the audio portion of the video come out of both speakers.

6.3.4 Cinema 4D XL

There were many concerns in creation of the 3D animations within Cinema 4D that revolved around keeping the file size to a minimum while optimizing graphic quality.

Using grouping, Extrusion NURBS, good texture configuration, timeline Keyframe effect modification, lighting and other modifiers formed the animation outcome. 4D Cinema creates the transformation between two Keyframes that contain different views of 3D objects. The rendering of the finished animations involves such issues as graphic qualities, the video format type, naming convention, pixel size and frame rate. Rendering and determining various other settings were keys in keeping the polygon count low. The more polygons, the more detailed an object is and the larger the 3D file gets. Texturing, rotating, growing and warping different 3D objects gives it more polygons (shapes, plane figures, pieces), just as a flying, jumping or disappearing animation properties assigned to 3D objects creates more detail.

6.3.5 Cleaner 5

Cleaner 5 smoothed out rough spots in audio and video files by organizing the color, pixels and noise. Cleaner 5 uses codecs to remove redundant data in each image of a video, audio, or animation sequence. An overall structure for these media files is implemented through the use of specific codecs that encode components to fit within this file structure. This organization process reduces and optimizes files size so that media files will run more efficiently within applications and over the Web. My .avi, .mp3, .wav, and .mov files were cleaned so they would run smoother within my Lectora application on the interactive CD and Web site.

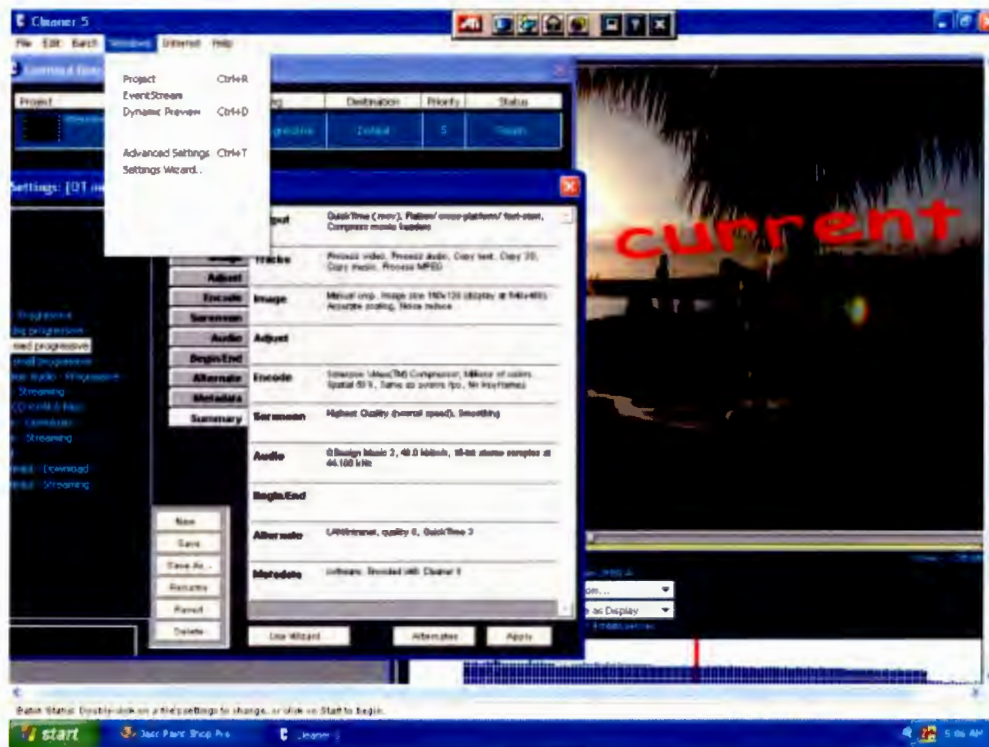


Figure 13. Terran Cleaner 5

6.3.6 Flash 5

Flash 5 was used to create a Flash .avi introduction for Lectora Publisher. Working with layers, creating motion tweens, proper use of the work area and dealing with numerous Keyframe modifications within the time line are important elements to be dealt with in creating a Flash animation. Placing one Layer above another puts the images of that Layer in front of the images in Layers below it. Attributes Flash tweens include position, size, rotation, and skew of instances, color, groups and type. The motion tween changes in Flash are automatically dependent on the distance between Keyframes. Different instances or versions of objects are placed in each Keyframe location; Flash creates a transformation/tweens between two Keyframes.

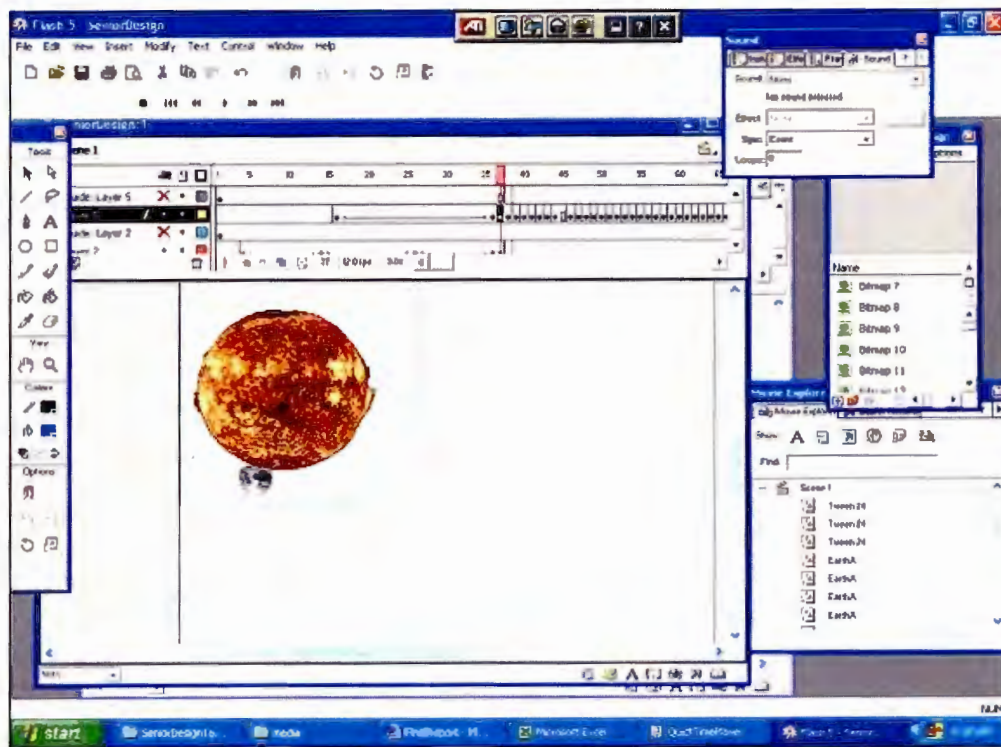


Figure 14. Flash 5

6.3.7 Jasc Paint Shop Pro 7 with Animation Shop

Understanding and working with special effects, file format, canvas size, image size, quality, save settings and tools within Paint Shop Pro are what it takes to create a professional image. I used Paint Shop Pro to create .gif and .jpg images for the Flash movie as well as the Blue Armed Sun band Icon, edit the Earth image, text, and background images. The animation Flash sections of the morphing of the Sun after it is hit by the earth was saved as a .gif animation in Animation Shop, and imported as a .gif animation into Flash. This Sun hit Earth animation created in Animation Shop involved many rendering adjustments as well as image effects and transitions. The first version of the animated logo was also created in Animation Shop and can be seen on the “Pictures” page of the application.

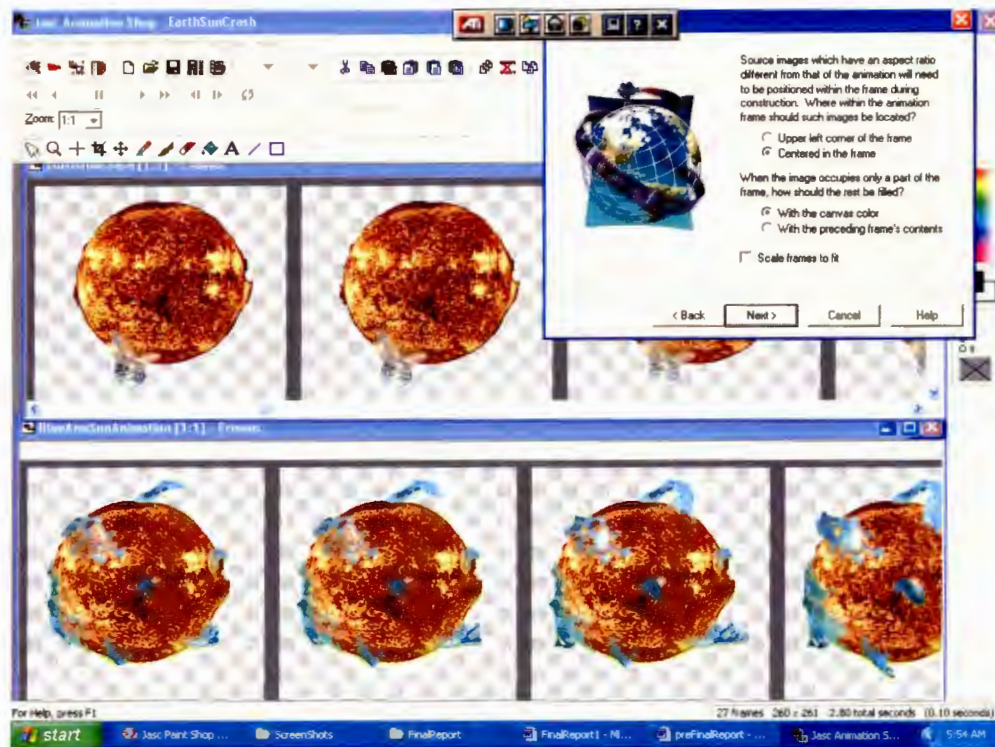


Figure 15. Animation Shop

6.3.8 Lectora Publisher

Knowing Lectora's organizational structure, file types, interactivity, Web site design practicals, and Publishing options are important in the construction of a quality application. Image, video, text, audio, buttons and actions are the primary objects that were organized, resized and modified. Interaction, background, Layer, position, size and file type were some of the main object attributes with settings to be specified. HTML modification for the location of the video and audio files was necessary in order to access them on the Linux Streaming Media Server. In order for the questions on the Help Page to function on the Internet a Java applet object had to be added to my Lectora project.

7. Conclusions and Recommendations

This is the first publishable version of the interactive CD and Web site for Kinition Fit. The quality of all of the elements involved is quite high because the top of the line software packages and excellent hardware were properly used for this project. The audio quality was high because the final tracks were cut at a recording studio. With more time, budget, development, experience, professional recording environment and video editing software and hardware the project quality could be higher quality. The video quality was high however because of proper configurations and use of an IEEE 1394 FireWire card. Furthermore good movie recording equipment to capture the music video footage and do the editing was used to provide good digital video. It would be a good idea for someone desiring to do a project like this to understand streaming media before considering using it. I recommend a person doing a project of this type and magnitude use similar programs and processes used in this project.

Appendix A.

Generated URL Code

Animal Urges

```
<EMBED SRC="http://10.23.1.254/scripts/starbak_logo.qti" TYPE="image/x-quicktime" WIDTH="650" HEIGHT="490" ALIGN="center" VALIGN="middle" QTSRC="rtsp://10.23.1.254:554/OCASSeniorDesign/EMD/Animal%20Urges.wma">
```

This World

```
<EMBED SRC="http://10.23.1.254/scripts/starbak_logo.qti" TYPE="image/x-quicktime" WIDTH="650" HEIGHT="490" ALIGN="center" VALIGN="middle" QTSRC="rtsp://10.23.1.254:554/OCASSeniorDesign/EMD/This%20World.wma">
```

M's Revenge

```
<EMBED SRC="http://10.23.1.254/scripts/starbak_logo.qti" TYPE="image/x-quicktime" WIDTH="650" HEIGHT="490" ALIGN="center" VALIGN="middle" QTSRC="rtsp://10.23.1.254:554/OCASSeniorDesign/EMD/M%27sRevenge.wma">
```

One More Call (Music Video)

```
<object id="MediaPlayer" classid="CLSID:22d6f312-b0f6-11d0-94ab-0080c74c7e95" codebase="http://activex.microsoft.com/activex/controls/mplayer/en/nsmp2inf.cab#Version=6,4,7,1112" width="320" height="320" standby="Loading Microsoft Windows Media Player components..." type="application/x-oleobject"><param name="FileName" value="mms://10.23.1.254:1755/OCASSeniorDesign/EMD/1finalcall.wmv"><param name="TransparentAtStart" value="true"><param name="AutoStart" value="true"><param name="AnimationatStart" value="false"><param name="ShowPositionControls" value="false"><param name="ShowDisplay" value="false"><param name="ShowControls" value="true"><param name="ShowStatusBar" value="true"><param name="ShowCaptioning" value="false"><param name="ShowGotoBar" value="false"><param name="DisplayForeColor" value="0,128,128"><embed type="application/x-mplayer2" pluginspage="http://www.microsoft.com/Windows/Downloads/Contents/Products/Media Player/" src="mms://10.23.1.254:1755/OCASSeniorDesign/EMD/1finalcall.wmv"
```

```
name="MediaPlayer" Width="320" Height="320" TransparentAtStart="0"  
AutoStart="1" AnimationAtStart="0" ShowPositionControls="0" ShowDisplay="0"  
ShowStatusBar="1" ShowControls="1" ShowCaptioning="0"></object>
```

Appendix B.

Project Multimedia Terms

Video Editing:

Scoring

Using tempo changes to ensure that video remains synchronized with audio tracks throughout a project

IEEE 1394

is a standard defining a high-speed serial bus. This bus is also named FireWire by Apple or i.Link by Sony. All these names refer to the same thing, but the neutral term IEEE 1394 (or just 1394) is used on these web pages and in the sources.

What exactly is IEEE 1394? It is a serial bus similar in principle to USB, but runs at speeds of up to 400 Mbit/s and is not centered around a PC (i.e. there may be none or multiple PCs on the same bus). It has a mode of transmission which guarantees bandwidth which makes it ideal for digital video cameras and similar devices.

HTTP

As far as performance and reliability goes ftp is the better protocol. HTTP is a stateless protocol. A page or item is requested and sent. There are no means of checking that the package got there in its entirety or that data packets were not lost along the way. Any large file is going to be problematic. FTP on the other hand uses two channels, one for data and one for flow control. Much better way to send data packets this way. <http://www.w3.org/Protocols/HTTP/ietf-http-ext/>

The Hypertext Transfer Protocol (HTTP) is the set of rules for exchanging files (text, graphic images, sound, video, and other multimedia files) on the World Wide Web. Relative to the TCP/IP suite of protocols (which are the basis for information exchange on the Internet), HTTP is an application protocol. Essential concepts that are part of HTTP include (as its name implies) the idea that files can contain references to other files whose selection will elicit additional transfer requests. Any Web server machine contains, in addition to the HTML and other files it can serve, an HTTP daemon, a program that is designed to wait for HTTP requests and handle them when they arrive. Your Web browser is an HTTP client, sending requests to server machines. When the browser user enters file requests by either "opening" a Web file (typing in a Uniform Resource Locator) or clicking on a hypertext link, the browser builds an HTTP request and sends it to the Internet Protocol address indicated by the URL. The HTTP daemon in the destination server machine receives the request and, after any necessary processing, the requested file is returned. http://whatis.techtarget.com/definitionsAlpha/0,289930,sid9_alpH_idx75,00.html

HTTP (Hypertext Transfer Protocol), the World Wide Web application protocol that runs on top of the Internet's TCP/IP suite of protocols, now exists in a newer version, HTTP 1.1, that promises to bring Web pages a little faster to your browser and reduce some of the Web's enormous traffic. Developed by a committee of the Internet Engineering Task Force (IETF) that includes the Web's chief creator Tim Berners-Lee, HTTP 1.1 exists as a "proposal," but in fact, most major Web servers and browser clients are at some stage of supporting it.

FTP

File Transfer Protocol

File Types:

<http://www.computeruser.com/resources/dictionary/filetypes.html>

www.whatis.com. /

<http://www.whatis.com/fileFormatA/0%2C289933%2Csid9%2C00.html>

.HTML

(Hypertext Markup Language) is the set of markup symbols or codes inserted in a file intended for display on a World Wide Web browser page. The markup tells the Web browser how to display a Web page's words and images for the user. Each individual markup code is referred to as an element (but many people also refer to it as a tag). Some elements come in pairs that indicate when some display effect is to begin and when it is to end.

***Converting a .avi, .mp3, or .wav file to a .asf file:**

Definition for: .ASF (File Extension Definition): **ASF Advanced Streaming Format**(ASF)

A data format for streaming audio and video content, images, and script commands in packets over a network. ASF content can be an .asf file or a live stream generated by Windows Media Encoder. ASF content that is in the process of being delivered over a network is called an ASF stream.

Microsoft has defined yet another audio/video/multimedia format to support streaming audio and video over the Internet. This is ASF (formerly Active Stream Format and now Advanced Streaming Format). ASF is used for streaming audio/video/multimedia and for stored files. These files have the extension .asf they are used as part of Microsoft's NetShow video server and client over the Internet. The NetShow authoring tools include a DOS command line utility: VidToAsf which converts AVI files to ASF files, preserving whatever compression was used. VidToAsf can also convert .mov (QuickTime) files to ASF files. Like AVI, ASF files support many audio and video compression schemes.

The NetShow Tools include a Microsoft Windows graphical application called the ASF Real Time Encoder which can also convert AVI and WAV files to ASF files. The ASF Real Time Encoder is installed under Microsoft NetShow in the Start | Programs menu under Windows 95 and Windows NT 4.0

ASF Real Time Encoder. For more information including software:

<http://www.microsoft.com/asf/> The Advanced Systems Format (ASF) is the [file format](#) used by Windows Media Technologies. Audio and/or Video content compressed with a wide variety of codecs can be stored in an ASF file and played back with the Windows Media Player (provided the appropriate codecs are installed), streamed with Windows Media Services or optionally packaged with Windows Media Rights Manager.

The Advanced Systems Format (ASF) is an extensible file format designed to store synchronized multimedia data. It supports data delivery over a wide variety of networks and protocols while still proving suitable for local playback. ASF supports advanced multimedia capabilities including extensible media types, component download, scaleable media types, author-specified stream prioritization, multiple language support, and extensive bibliographic capabilities, including document and content management. <http://www.microsoft.com/netshow/>

(.asf) is also associated with other files, having different meanings for different programs. Active Streaming File – also a HoTMetaL Pro (filename extension). Music file (Electronic Arts); StratGraphics Datafile; Lotus 1-2-3 Screen font

http://www.soniacoleman.com/Tutorials/PowerPoint/Sound/convert_avi_to_asf.htm

Audio Video Interleaved (AVI).

(Audio Video Interleaved) Windows multimedia video format from Microsoft. It interleaves standard waveform audio and digital video frames (bitmaps) to provide reduced animation at 15 fps at 160x120x8 resolution. Audio is 11,025Hz, 8-bit samples. (.avi) Microsoft Audio Video Interleaved file for Windows movie.

AVI stands for Audio Video Interleave. It is a special case of the RIFF (Resource Interchange File Format). AVI is defined by Microsoft. AVI is the most common format for audio/video data on the PC. AVI is an example of a *de facto* (by fact) standard.

<http://www.jmcgowan.com/avi.html>

The AVI file format that supports a specific type of MPEG files [Ref 1], called Editable MPEG. Editable MPEG files offer significant compression of video data while preserving an image quality close to the original, and allowing frame accurate editing as well as multiple compression-decompression sequences. These are significant advantages over normal MPEG files, at the expense of a higher compressed data rate: typically 600 KByte/s (vs. 150 KByte/s).

On the other hand, almost all multimedia tools and packages today rely on the AVI file format to handle audio and video data. As stated in the introduction, this document describes an extension to the AVI file format that handles a particular type of MPEG files and thus allows editing and conversion to a normal MPEG file format, while maintaining the image quality.

<http://www.graphcomp.com/info/specs/ms/editmpeg.htm>

AVI is a technology developed by Microsoft that enables video images to be displayed on 386 or 486 PCs without additional hardware. This "software-only" technology was released in 1992 as an extension of *Windows 3.1* called *Microsoft Video-for-Windows (VfW)*. A synchronized sound track may be included in a *Video-for-Windows* file, and this is delivered through whatever sound board is installed in the PC.

The *Video-for-Windows* developer's kit contains a suite of AVI devices, compression codecs and editing utilities that enable users to capture video from standard analogue sources using any one of a variety of low-cost capture boards. The developer's kit also contains several hundred sample video clips. Among the kit's utilities is one that will convert *QuickTime* video into *Video-for-Windows* (the reverse translation is not supported), and there is also a freely distributable runtime that will add the extensions required to deliver *VfW* files to any *Windows* installation. <http://ibis.nott.ac.uk/guidelines/ch62/chap6-2-C-5.html>

CDA

CD Audio Track (.cda). This file type is used so audio tracks can be played on almost any CD player.

MPEG

An image-[compression](#) scheme for full motion video proposed by the Motion Picture Experts Group, an ISO-sanctioned group. MPEG image scheme offers more [compression](#) than the JPEG scheme, which is largely for still images, because it takes advantage of the fact that full motion video is made up of many successive frames consisting of large areas that are not changed- like blue sky background. While JPEG, compresses each still frame in a video sequence as much as possible MPEG also performs "differencing," noting differences between consecutive frames. If two consecutive frames are identical, the second can be stored with the appropriate information. MPEG condenses moving images about three times more tightly than JPEG. <http://www.why-not.com/articles/vidapps.htm>

MPEG (pronounced EHM-pehg), the Moving Picture Experts Group, develops standards for digital video and digital audio compression. It operates under the auspices of the International Organization for Standardization (ISO). The MPEG standards are an evolving series, each designed for a different purpose.

MPEG-1 was designed for coding progressive video at a transmission rate of about 1.5 million bits per second. It was designed specifically for Video-CD and CD-i media. MPEG-1 audio layer-3 (MP3) has also evolved from early MPEG work.

MPEG-2 was designed for coding interlaced images at transmission rates above 4million bits per second. MPEG-2 is used for digital TV broadcast and DVD. An MPEG-2 player can handle MPEG-1 data as well.

MPEG-1 and -2 define techniques for compressing digital video by factors varying from 25:1 to 50:1. The compression is achieved using five different compression techniques:

A proposed MPEG-3 standard, intended for High Definition TV (HDTV), was merged with the MPEG-2 standard when it became apparent that the MPEG-2 standard met the HDTV requirements.

.MP3 (MPEG-1 Audio Layer-3)

is a standard technology and format for compression a sound sequence into a very small file (about one twelfth the size of the original file) while preserving the original level of sound quality when it is played. MP3 files (identified with the file name suffix of ".mp3") are available for downloading from a number of Web site. Many Windows 98 users will find that they have a player built into their operating system. Otherwise, you can download a player from one of several popular MP3 sites. MP3 files are usually download-and-play files rather than streaming sound files that you link-and-listen-to with RealPlayer and similar products (However, streaming MP3 is possible.) Winamp (PC), MacAmp (Mac), and mpeg123 (UNIX) are popular MP3 players, but there are many others. To create an MP3 file, you use a program called a ripper to get a selection from a CD onto your hard disk and another program called an encoder to convert the selection to an MP3 file. Most people, however, simply download MP3s from someone else and play them.

digital audio is typically created by taking 16 binary digit samples a second of the analog signal. Since this signal is typically spread out over a spectrum of 44.1 thousand cycles per second (kHz), this means that one second of CD quality sound requires 1.4 million bits of data. Using their knowledge of how people actually perceive sound, the developers of MP3 devised a compression algorithm that reduces data about sound that most listeners can not perceive. MP3 is currently the most powerful algorithm in a series of audio encoding standards developed under the sponsorship of the Motion Picture Experts Group (MPEG) and formalized by the International Organization for Standardization (ISO).

Since it is relatively easy to create MP3 files from CD selections and make them available on Web sites for downloading, companies and sites that promote the MP3 format are sometimes accused of encouraging copyright violations. (It is illegal to copy music from a CD and redistribute it unless you have the copyright owner's permission.) On the other hand, MP3 enthusiasts claim that what CD publishers are afraid of is any kind of non-CD distribution. While there are several proposals for how to discourage such piracy, there is currently no secure distribution and copyright management standard that publishers and other parties agree upon.

MPEG4

MPEG (Motion Picture Experts Group) Standard 4 (MPEG4) is a protocol for webbased multimedia (video and audio, etc...) applications. The protocol is still being developed, the work is done mostly by the MIT Machine Listening Group.

Streaming software is not available yet, so cannot decode in real time. Available decoder is slow and highly variable to the music being decoded.

http://media2.bmrc.berkeley.edu/classes/m198/smyau/public_html/mp4home.html

MPEG-4 is a new international standard from the International Organization for Standardization (ISO). The MPEG-4 Video (there is more to the standard than the video part) is closely related to ISO H.263.

There are (at least) three versions of MPEG-4 for Video for Windows from Microsoft and two versions from DivX. The most recent Microsoft MPEG-4, as of October 25, 1999, is Microsoft MPEG-4 Video Codec Version 3, identified by the Four Character Code MP43. MPEG-4 Version 3, MP43, Version 2, MP42, and Version 1, MP41, are included in the Windows Media Technologies. Specifically, the Windows Media Tools contains the Microsoft MPEG-4 Video Codec Version 3 Application Extension, formerly known as a Dynamically Linked

Microsoft's NetShow 2.0 installs a Video for Windows codec for MPEG-4. MPEG-4 is a new international standard that has not been officially released as yet. Microsoft is deeply involved in the MPEG-4

standardization effort. Microsoft has been using its MPEG-4 for the Microsoft NBC Business Video broadcasting over the Internet.

The Microsoft MPEG-4 Video for Windows Codec identifies itself as "MPEG-4 High Speed Compressor" in Control Panel | Multimedia | Devices | Video Compression Codecs.

*If you think the .avi / MPEG4 info. I have in the notes is extensive there's tons and tons and tons more @ <http://www.jmcgowan.com/avi.html>. This is a great site if you need file conversion utilities for many software companies. Information is included concerning about converting CD .wav files to .mp3, and other file types; as well as finishing a CD with program utilities so that the music burnt to a CD can run on any common CD player and make the song un-editable on the CD/read only.

Wave

The Microsoft Windows audio (sound) input/output system, commonly referred to as Wave or WAVE, predates Video for Windows, which is wrapped around WAVE in various ways. The audio tracks in AVI files are simply waveform audio (or WAV) data used by the wave system. Video for Windows parses the AVI files, extracts the WAV data, and pipes the WAV data to the WAVE system. Video for Windows handles the video track if present.

Traditionally, audio input and output devices such as Sound Blaster Cards have a WAVE audio input/output driver to play WAV (waveform audio) files.

AVI and WAV files are closely related. WAV files are the sound file format, and frequently provide the source for the sound tracks in an AVI file. The sound tracks in an AVI file are Microsoft Waveform Audio (WAV) files. The Waveform Audio files can be uncompressed PCM (Pulse Code Modulated) audio or compressed with many different audio codecs (compressor/decompressors).

Note also that with the recent extension of the Wave format to support the MPEG Audio compression standard [Ref 5], compressed audio streams can be interleaved with the MPEG video stream following the normal AVI interleaved format [Ref 2].

QuickTime

Multimedia extensions to Macintosh's System 7 that add sound and video capabilities.

A QuickTime file can contain up to 32 tracks of audio video, MIDI or other time-based control information. Most major Macintosh DBMSs (database management systems) support QuickTime. Apple also provides a QuickTime for Windows version for Windows-based PCs.

Compression

Compression is the reduction in size of data in order to save space or transmission time. For data transmission, compression can be performed on just the data content or on the entire transmission unit (including header data) depending on a number of factors.

Content compression can be as simple as removing all extra space characters, inserting a single repeat character to indicate a string of repeated characters, and substituting smaller bit strings for frequently occurring characters. This kind of compression can reduce a text file to 50% of its original size.

Compression is performed by a program that uses a formula or algorithm to determine how to compress or decompress data.

Graphic image file formats are usually designed to compress information as much as possible (since these can tend to become very large files).

There are several underlying technologies used by different Video for Windows Codecs. For example, Indeo 3.2 and Cinepak both use Vector Quantization. The international standards MPEG-1, MPEG-2, MPEG-4, H.261, and H.263 all use a combination of the block Discrete Cosine Transform (DCT) and motion estimation/compensation. Several of the New Wave codecs use wavelet transform based image

compression (the Discrete Wavelet Transform or DWT). Other technologies include Fractal Image Compression, represented by Iterated Systems.

All of the widely used video codecs are lossy compression algorithms. At sufficiently high compression most of them will have problems with the edges in the image. Vector quantization, block Discrete Cosine Transform, and wavelet based image and video compression inherently do not mathematically represent the intuitive notion of an edge or line.

THE POINT: In using and selecting video codecs, the author of an AVI file (or a compressed digital video in general) needs to achieve NATURALLY LOSSY COMPRESSION or better. Once the compression introduces noticeable AND unnatural artifacts, the video is of very limited use even in cases where some features and objects are recognizable.

Video Compression Standards

(With relation to networks)

Uncompressed video would be totally unwieldy on today's LANs, not to mention on WANs.

An uncompressed stream of video for creating a full-screen (640-by-480 pixels), 30 frames per second (fps), 24-bit color picture requires about 208Mbps of bandwidth, and disk space to match. Compression can reduce the massive video stream to manageable proportions.

Video compression and decompression can take place in hardware or software. The content provider may perform the compression, or the user may do it. Decompression takes place at the workstation. Software, decompression usually limits playing rates to less than 15fps. But 20fps 25fps, or even 30fps speeds are not impossible with the right client hardware, such as a fast graphics card and video bus.

Hardware-based decompression supports rates of 30fps, but it requires a compression/decompression (codec) card from vendors such as Intel, RasterOps (Santa Clara, CA) or Sigma Designs (Fremont, CA). Codecs can cost as little as \$400; however, prices of \$800 and higher are more typical.

[MPEG](#) is the most popular type of hardware decompression. It's used for distributing non-editable full-motion video. The current version, MPEG-1, typically requires 1.2Mbps of transmission capacity, which translates to 9MB per minute of storage. However, higher-quality video can be attained with 2.4Mbps transmission and 18MB of storage.

Digital Video Interactive (DVI) is another compression standard that usually uses hardware-assisted decompression. Its data rates and storage requirements are similar to those of [MPEG](#).

The Joint Photographic Experts Group compression standard, or JPEG, is for compression of still frames. M-JPEG (Motion JPEG) takes JPEG into the video realm. M-JPEG requires hardware decompression. It's used for distributing full motion video in an editable format. Because its storage and transmission requirements are more than twice those of [MPEG](#), it's not popular for networked applications.

Audio-Video Interleave ([AVI](#)) is not a compression type but a file format supported by Microsoft's [Video for Windows](#). Indeo, Intel's compression standard, is the most popular type of compression for video files in [AVI](#) format. Indeo uses software decompression. It requires 1.2Mbps bandwidth and 9MB per minute of storage.

Cinepak is the standard compression type for [QuickTime](#), a multimedia environment for Macintoshes. Cinepak's requirements are similar to Indeo under [AVI](#).

Second, video information must be provided continuously and smoothly to multiple simultaneous users. In other LAN applications, discontinuities in data flow are less visible or annoying to users. Where popular hardware and software environments are not optimal for video, video server products modify or enhance the environment through either hardware or software.

*The following site could be helpful if you want to convert one filetype to another (ie: .wav to .mpe)
<http://mpegx.com/>

Windows Multimedia System

In Win16 and Win32, Microsoft created a partially unified system for handling multimedia. This system consists of the high level Media Control Interface or MCI Application Programming Interface (API) and associated MCI drivers. Playback of AVI files can be controlled through the high level MCI API and the MCI\AVI.DRV MCI driver.

The Windows Multimedia System also provides a number of low level API's such as the WAVE API for waveform audio and associated device drivers such as the WAVE device drivers for sound cards.

MCI (high level API - useful for AVI playback)

Video for Windows

Video for Windows is an entire system for handling video in Microsoft Windows. It was part of MS Windows 3.1 The original Video for Windows is a collection of 16 bit windows utilities, dynamic link libraries, and other components. The AVI file and file format is a central part of Video for Windows.

.WMA

Audio file in Microsoft Windows Media format (Can be changed to ASF) Siren (Sonic Foundry)

.WMV

Video file in Microsoft Windows Media format

Using Windows Media Technologies you can create, deliver, and play streaming media files in the advanced streaming format, which includes files with .asf, .wma, and .wmv file extensions. This format solves the problem of long download times by starting playback while the data is still being sent. Windows Media files send the first part of the audio or video data first and collect it in a buffer. While that data is being played, the rest of the data continues to flow in time to be played.

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